

REMARKS

Claims 1-9 are pending.

An Information Disclosure Statement and PTO Form SB/08 are submitted which lists the art cited and considered in the parent application.

Claim 1 has been amended to incorporate the subject matter of original claim 8. Therefore, original claims 7 and 8 have been cancelled. This leaves claims 1-6 and 9 active.

The present invention as recited in amended claims 1-6 and 9, with claim 1 being the main claim, recite a grinding step (A) in which raw soybeans are ground to provide a soybean slurry and a heating step (B) in which the soybean slurry is heated. As set forth in main claim 1, in the heating step (B) the soybean slurry is flowed alternately between a large diameter pipe arranged in a straight line and a small diameter pipe bent in a turning configuration. The method also includes a step (C) in which part way through the heating step (B) a deaeration step is performed for removing air bubbles mixed in with the soybean slurry.

By making the diameter of the curved (turning) section of the pipe through which the soybean slurry is circulating small, the speed at which the soybean slurry circulates is increased. This results in the dynamic pressure of the soybean slurry increasing and thereby decreasing the static pressure. Therefore, the action of suctioning the steam in the steam outlet is strengthened and the efficiency of the steam blowing is improved, thereby providing an effect of stirring the soybean slurry. See page 16, lines 19-26 of the Specification.

Furthermore, because air bubbles are generally generated if the soybean slurry is stirred too vigorously, it is preferred that the soybean slurry is normally made to circulate in a piston flow state inside the pipe through which the soybean slurry is circulating. By

heating and deaerating the soybean slurry as it is made to circulate in a piston flow state while being more vigorously treated in the curved small diameter section in this way, the present invention is able to achieve a further advantageous effect. See page 17, lines 19-27 of the Specification.

Since claim 1 is now effectively claim 8, the rejection of claims 7 and 8 is discussed.

Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 02-49556 taken together with Hester, et al. U.S. 6,063,204.

JP 02-49556 discloses a method having a first step for heating raw "GO" (ground soybean) liquid at 60-80°C for a prescribed time that is combined with a second step for heating the raw "GO" liquid at 100°C for a prescribed time. JP 02-49556 also discloses an apparatus having an open tank 2 connected to a low-temperature primary heater 1 for the raw "GO" liquid. A secondary heater 4 is connected to a separator 6 and a separator and deodorizer connected to the primary heater 1 are preferably used.

JP 02-49556 does not teach or suggest the above-mentioned novel and advantageous feature of step (B) in which, during the heating step, the soybean slurry flows alternately between a large diameter pipe arranged in a straight line and a small diameter pipe bent in a turning configuration.

Hester discloses mixing elements that are employed to replace long sections of smaller diameter pipe. These are used to effect higher flow rates and greater turbulence at a given mass throughput with relatively less expensive shorter sections of larger diameter pipe. Although depicted with mixing elements, it will be appreciated by those skilled in the art that a reduction of the reaction zone cross-sectional area can produce higher reaction mass flow velocities to thereby effect greater turbulence and negate the need for mixing elements. (See Hester, column 24, lines 41-50).

Hester relates to the technical field of systems for producing fermentable sugars from cellulosic feedstocks. This is different from the technical field of thermal deaeration of soybean slurries to which the present invention is directed. That is, Hester is not appropriate as a citation for determining the technical standards of a person skilled in the art of processing soybean products. Therefore, it is not reasonable to combine Hester with JP 02-49556.

Furthermore, Hester discloses various types of apparatus such as an extruder/reactor (Fig. 1) and a twin screw extruder/static-mixing reaction zone (Fig. 8). These are not related to a step for thermal deaeration of a soybean slurry such as in step (C) of the method of the present invention as set forth in claim 1. The subject matter disclosed at column 24, lines 41-50 in Hester, which was indicated by the Examiner, relates to such static-mixing. This subject matter is not related to a step for thermal deaeration such as set forth in the method of claim 1 of the present invention.

The apparatus disclosed in Hester also does not disclose the limitation of claim 1 of the grinding step (A) in which raw soybeans are ground to provide a soybean slurry, the heating step (B) in which the provided soybean slurry is heated, and the deaeration step (C) in which air bubbles mixed in with the soybean slurry are removed. Moreover, as is apparent from the drawings of Hester, the structure of the apparatus disclosed is quite unsuitable for performing the above-mentioned feature of flowing the slurry between the two different types of pipes having different diameters. The lack of these features further demonstrates that the combination of Hester with JP 02-49556 is not at all reasonable.

As discussed above, JP 02-49556 does not disclose at least the feature of step (B) of claim 1 in which the soybean milk is flowed between different types of pipe sections. Hester shows neither the feature (B) of claims 1 nor the feature (C). Further, as shown above, it is not proper to combine the two references.

The present invention as set forth in main claim 1 exhibits advantageous effects. Accordingly, amended claim 1 is not obvious over the applied references and its novel subject matter is patentable. Claims 2-5, which depend from claim 1, also are patentable.

Claims 7 and 8 are also rejected and claim 9 is rejected over Matsuura in view of Hester. The following argument is directed to amended claim 1 which contains the subject matter of claims 7 and 8. Claim 9 depends from amended claim 1 (claim 8).

Matsuura discloses a process for producing an aseptic packed tofu in which there is:

(a) a step of putting soybeans into a grinder with 3-5 times their dry weight of water and grinding the soybeans at a temperature of 40°C to 50°C to obtain a soybean slurry;

(b) heating the soybean slurry at 80 to 100°C, and then filtering the heated soybean slurry to obtain a soybean milk;

(c) heat-sterilizing the soybean milk at a temperature not lower than 130°C for at least 1 second;

(d) aseptically adding a sterilized coagulant to the sterilized soybean milk, mixing them, aseptically packing the mixture into a sterilized container and sealing the container; and

(e) heating the mixture in the sealed sterilized container at 70 to 100°C to coagulate it.

First of all, Matsuura does not show step (B) of claim 1 in which the soybean milk is alternately flowed between two different types of pipes during the heating step. Also as noted above, Matsuura carries out "a step of aseptically adding a sterilized coagulant to the sterilized soybean milk" between the first heating step (b) and the second heating step (e). The step of "adding a sterilized coagulant" of Matsuura is a completely

different constituent feature from that of the limitation of step (C) of claim 1 in that during the heating step (B), a deaeration step (C) for removing air bubbles mixed in with the soybean slurry is performed. That is, the coagulant in Matsuura is an agent for coagulating tofu, and only the simple addition of such an agent is disclosed.

Moreover, Matsuura discloses that a soybean slurry produced by an ordinary grinding process causes severe foaming when heated and addition of defoamant is necessary (see column 2, lines 57-62). This is quite different from the deaeration step (C) of claim 1 of the subject application. It is clear that Matsuura does not disclose the deaeration step (C) of claim 1.

The deficiencies of the Hester patent are discussed above. There also appears to be no logical basis to combine Hester with Matsuura for many of the same reasons discussed above relative to JP 02-49556. Also, even if the combination is made, it does not cure the basic defect in Matsuura relative to the novel and advantageous features of steps (B) and (C) of claim 1, as discussed above. Therefore, claim 1, which now corresponds to claims 7 and 8 is patentable over the combination of Matsuura and Hester.

Claim 9 depends from claim 1 and recites a further feature of the invention. In view of the allowability of claim 1, claim 9 also should be patentable.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over any one of JP 11117755, Matsuura and JP 02-49556. Claim 6 depends from claim 1 and recites further details of the deaeration step (C) in which air bubbles are removed. In view of the allowability of claim 1, claim 6 also should be patentable.

The present invention is innovative in that it is possible to effectively deaerate a soybean slurry, which was conventionally difficult to do, and it is possible to reduce the unpleasant odor which is present in tofu and soymilk. That is, according to the present invention, it is possible to produce tofu products and soymilk products in which the unpleasant odor is less than that present in products produced by conventional methods. The present invention greatly contributes to industrial development and public health in that it is possible to make wide use of soybeans as food products.

Accordingly, all remaining claims are patentable and should be allowed.

The other art cited has been considered and is not deemed pertinent.

Prompt and favorable action is requested.

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